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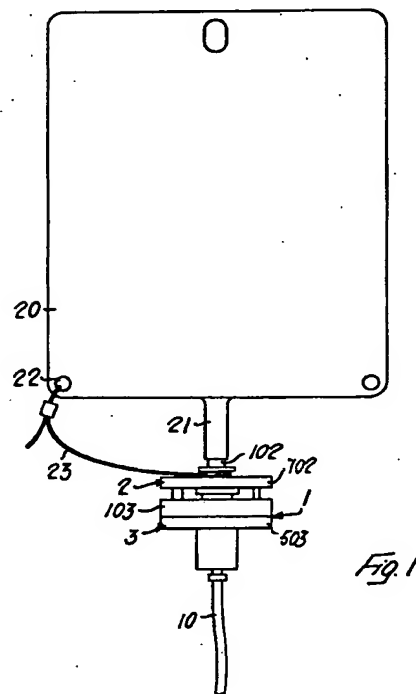
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(54) **Blood or hemo-derivatives transfusion device**

(57) Device for the transfusion of blood or hemo-derivatives comprising: a blood or hemo-derivatives container (20; 30); means for the transfusion (10) of blood or hemoderivatives to the patient; and means for connecting said container to said means for the transfusion (10); said means for connecting comprise a joint (1) formed by two central tubular mutually connectable members (2, 3), both provided with complementary coding means (302, 402, 113, 123; 502, 602, 153, 163) and means (202, 203) for locking said connectable members (2, 3) together.



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Description

The present invention relates to a device for the transfusion of blood or hemo-derivatives products.

Usually, transfusions are carried out by connecting the means of transfusion of fluid to the patient, such as for instance a defluxor connected to a venous catheter, to a blood or hemo-derivatives container. A serious problem, arising practically at each transfusion to be carried out, is that the patient to be transfused be receiving a blood or hemo-derivative which is compatible with the group of the blood of patient. namely, The above control on the group of the blood or hemo-derivative directed to the patient is usually carried out at a visual level, and can be affected by mistakes or slips, especially in emergency conditions.

A task of the present invention is to introduce in a transfusion device a control system preventing in a sure and positive manner any connection between the container and the transfusion means whenever the blood or hemo-derivative in the container is not compatible with the blood of the patient.

An object of the present invention is therefore a device for the transfusion of blood or hemo-derivatives comprising: a blood or hemo-derivatives container; means for the transfusion of blood or hemoderivatives to the patient; and means for connecting said container to said means for transfusion, characterized in that said connecting means comprise a joint formed by two central tubular mutually connectable members, both provided with complementary coding means and with means for locking said connectable members together.

According to one preferred embodiment of the invention, such coding means comprise at least two pins projecting from one of such members parallelly to the axis of the such joint, the other member being provided with a plate having two or more holes complementary and coaxial to said pins.

Further advantages and features will become evident from the following description of some preferred embodiments of the present invention shown, by way of non-limiting examples, in the annexed drawings, in which:

Figure 1 is a side elevational view of a first embodiment of the transfusion device according to the present invention;

Figure 2 is a longitudinal sectional view through a particular of the device shown in Fig. 1, with the two members of the joint connected together;

Figure 3 is a view similar to that in Fig. 2, in which the two members of the joint are disconnected;

Figure 4A is a perspective view of the members shown in figures 2 and 3;

Figure 4B is a control platelet to be used in conjunction with the transfusion device of the invention;

tion with the transfusion device of the invention;

Figures 5 to 8 show diagrammatically the coding system used according to a further embodiment of the present invention; and

Figure 9 is still another embodiment of the device according to the invention.

With reference to the drawings, in Figure 1 is shown the transfusion device according to the invention; with numeral 1 is designed the joint connecting the tube 10 of the means of transfusion to the patient to the blood or hemo-derivatives container, that is, the bag 20. The joint 1 is formed by two members 2 and 3, connected one to another in the way better described later on. The end of the member 2 opposed to that connected with the member 3 shows a tubular element 102 (see figs. 2 and 3) that is inserted into the hose 21 of the bag 20. The tubular element 102 of the member 2 is fixed to the bag 20 by means of the strip 23 which is tied to a hole 22 formed on the edge of the bag 20. The member 3 is further provided with a plate 103 directed toward the member 2, for the purpose which will be later described.

In Figures 2 and 3 the joint 1 of the device according to the invention is shown in section. The said joint 1 comprises the member 2, consisting of disc-like member 702. Centrally, from one side of the member 702 a tubular element 102 projects upwardly. The said element 102 is made integral with the member 702 and is provided with an axial duct 112 extending up to the opposite side on the member 702. The said tubular element 102 fits into the hose 21 of the bag 20. On its opposite side, the member 702 is provided with a cylindrical extension 202 provided with an axial tapered recess 222 communicating with the duct 112 and further provided on its outer surface with two teeth 212 projecting radially. Two pins 302 and 402 of different cross section project parallelly to the axis of tubular element 102.

The member 3 also consist of a disc-like member 503, from which projects centrally, on the side facing the member 2, a cylindrical bush 203 inside provided with a thread 213. On the center of said bush 203 is formed a tapered extension 303, which is axially provided with a duct 313. On its opposite side, the member 503 is provided with a cylindrical body 403, axially provided with a recess 413, communicating with the duct 313; in the said recess 413 is lodged the end 11 of the tube 10 of the transfusion means. The bush 203 is provided on its lateral outer surface with the annular rib 223, cooperating with the groove 143 formed on the wall of the axial hole 133 of the plate 103. The said plate 103 have also the holes 113 and 123 respectively complementary to the pins 302 and 402.

In figure 4B, the numeral reference 4 designs a recognition platelet, provided to the patient at the time of the determination of his blood group. Such platelet shows a reproduction of the geometry of holes of the

plate 103 of a member 3 of joint 1 that can be used on transfusion means. The said platelet 4 is provided with the holes 104 and 204, placed likely the holes 113, 123 of the plate 103 of the member 3. This insight provides a further utility to the personnel attending to such operations, further lowering the hazard of mistakes.

In Figures 5 to 8 is diagrammatically shown an embodiment of the coding system used in the transfusion device according to the present invention. In Figure 5 are shown, side by side, the face of the disc-like member 702 of the member 2 having the pins 502 and 602, which are different from the pins described above in that they have both the same section, and the face of the plate 103 of the member 3, having the holes 153 and 163, which have also the same section. In Figure 6 is shown the member 2 having the pin 602 in a different position from that of Figure 5, and the plate 103 have one hole 153 and two holes 163. The situation shown in Figure 7 is almost the same, except for the pin 602 that is in specular position in respect to that illustrated in figure 6, and the holes 163 are likely placed on the plate 103. In Figure 8, the pin 602 is in another different position, and the plate 103 has four holes 163.

In Figure 9 is finally shown a further embodiment of the device according to the present invention. The bag 30, similar to the bag 20 shown in Figure 1, have, at one side, at its end provided with the hose 31, a limb 34 provided with three holes: a central hole 36 and two side holes 35 and 35' diametrically opposed in respect to such central hole 36. The member 2 of the joint 1 of the device of the invention, previously described, is placed with the two pins 302 and 402 lodged into the holes 35 and 35' respectively, and the extension 202 fitted into the hole 36 of the limb 34. The member 2 is further linked with the strip 33 connected at one end to the tubular element 102 of the member 2 and at the other end to the hole 32 formed on the peripheral edge of the bag 30.

The operation of the transfusion device according to the invention will become evident as following. As it is known, normally to the blood or hemo-derivatives containers is applied, at the manufacturing, an identifying label of the group of the blood or hemo-derivative contained in it. The simple visual identification by the operator can be yet, in certain cases, cause of mistakes. According to the present invention, during the manufacturing step the member 2 of the joint 1 is coupled to the container, the bag 20 in the case shown in Fig. 1, by linking the same to the said bag with the strip 23. When the transfusion has to be carried out, the bag is chosen on the grounds of the compatibility of its contents with the blood of the receiving patient. Practically, the member 2 coupled to the bag is compared with the member 3, which has been mounted at an end of the means of transfusion, normally comprising a tube 10 connected to a defluxor in its turn connected to a venous catheter. The member 2 shall have the pins 302, 402 on its disc-like member 702 placed in such way that said pins can correctly match with the holes 113, 123 of the plate 103

of the member 3. The matching being verified, the member 2 and the member 3 of the joint 1 can be steadily connected turning the said member 503 in such way as to locking the bush 203 threaded and the extension 202 of the member 702 one to another. The contents of the bag 20 can now flow in the tube 10 and then to the defluxor and finally to the patient.

As shown in Figures 5 to 8, varying the position of the pins on the disc-like member 702 of the member 2 and the position of the holes on the plate 103 of the member 3 of the joint 1, there can be obtained the codings, for example necessary to the selection of the different compatibility of a patient to the blood contained in the bag 20. As it is known, to the different blood groups correspond different compatibilities, in facts, if the pins 502, 602 placed as shown in Figure 5 represent a group O donor, the group O receiver will have on the plate 103 of the member 3 connected to his means of transfusion, the holes as shown in this Figure. The patient having group A blood will have a member 3 with a plate 103 of the kind shown in Figure 6, and then he will result compatible either to the group O blood or to the group A blood. In the same way it will happen for the group B patient, that will be provided with the member 3 having the plate 103 shown in Figure 7. Finally, the group AB patient will be compatible to the blood of the donors of every group, and the plate 103 of its member 3 will be formed appropriately, as shown in Figure 8.

Advantageously, either in the embodiment shown in figures 1 to 4A, or in the embodiment shown in figures 5 to 8, the two pins placed on the member 2 of the joint 1 are different one to another. In the former case, the two pins lay on the same circumference, but the pin 302 has a bigger cross section than the pin 402; moreover, the position of the pin 402 is variable, whilst that of the pin 302 is fixed. Such an insight has the purpose of preventing the incorrect fitting of the pins 302, 402 in the holes 113, 123 of the plate 103; the said holes will be correspondingly of respectively different section. In the latter case shown in Figures 5 to 8, the same target is achieved with pins and holes of the same section, but laid on different circumferences. Also in this case, there is only one way to match the members of the joint one to another.

As described for the coupling during the manufacturing step of the member 2 with the bag 20, linking such member to the bag by the strip 23, the embodiment shown in Figure 9 allow to carry out such a coupling in a more careful and practical way. Thus, the pins being fitted into the holes 35, 35' of the limb 34, the loss or disengagement of the member 2 from the bag can be prevented. Obviously, the holes 35, 35' shall be complementary to the pins 302, 402 of the member 2 linked to the bag. By this way, a control of the contents of the bag 30 is then achieved, each pair of holes 35, 35' identifying a specific content of the said bag 30.

The transfusion device according to the invention minimize in the way above described the hazard of mistake in the administration to the patients of blood or

hemo-derivatives, then increasing the safety in the transfusion operations, and without excessive complications of the said operations.

Claims

1. Device for the transfusion of blood or hemo-derivatives comprising: a blood or hemo-derivatives container (20; 30); means for the transfusion (10) of blood or hemoderivatives to the patient; and means for connecting said container to said means for the transfusion (10), characterized in that said means for connecting comprise a joint (1) formed by two central tubular mutually connectable members (2, 3), both provided with complementary coding means (302, 402, 113, 123; 502, 602, 153, 163) and means (202, 203) for locking said connectable members (2, 3) together.
2. Device according to claim 1, in which said coding means comprise at least two pins (302, 402; 502, 602) projecting from one of said members (2, 3) parallelly to the axis of the said joint (1), the other member being provided with a plate (103) having two or more holes (113, 123; 153, 163) complementary and coaxial to such pins (302, 402; 502, 602).
3. Device according to claim 2, characterized in that the member bearing the pins (302, 402; 502, 502) is the member (2) which may be coupled to the blood or hemo-derivative container (20, 30), whilst the member of the joint (1) provided with two or more holes (113, 123; 153; 163) is the member (3) which is connected to said means for transfusion (10).
4. Device according to claim 3, in which said pins (302, 402) lay on said element (2) on the same circumference centered on the axis of the joint (1).
5. Device according to claim 3 or 4, in which said pins (302, 402) have different sections one to another, being correspondingly different the section of the holes (113, 123) formed on the other member (3) of said joint (1) and complementary to said pins (302, 402).
6. Device according to claim 3 or 4, in which said pins (502, 602) have all the same section, being correspondingly equal the section of the holes (153, 163) formed on the other member (3) of said joint (1) and complementary to said pins (502, 602).
7. Device according to claim 5 or 6, in which said pins (502, 602) lay on said element (2) on different circumferences centered on the axis of the joint (1), being correspondingly placed on different circumferences the holes (153, 163) formed on the other member (3) of said joint (1) and complementary to said pins (502, 602).
8. Device according to anyone of the preceeding claims 3 to 7, in which said means for locking comprise a bush (203) placed on a member (2, 3) of the joint (1) and an extension (202) cooperating with said bush (203) placed on the other member, the member (3) connected to the means for transfusion being provided with a free-rotating plate (103), on which are formed said holes (113, 123; 153, 163).
9. Device according to anyone of the preceeding claims 3 to 8, in which said member (2) of the joint (1) couplable to the blood or hemo-derivative container (20; 30) is linked to said container (20; 30) during the manufacturing step of the same, by means of appropriate linking means (23; 33).
10. Device according to claim 9, in which said container (30) is provided with a limb (34) projecting laterally and outwardly, connected or integral to said container (30), in which are formed holes (35, 35') complementary to the pins (302, 402; 502, 602) of said member (2) of the joint (1) coupled to the said container (30).
11. Device according to anyone of the preceeding claims, characterized in that further comprise a recognition element (4) reproducing the specific receiving coding for a possible transfusion.

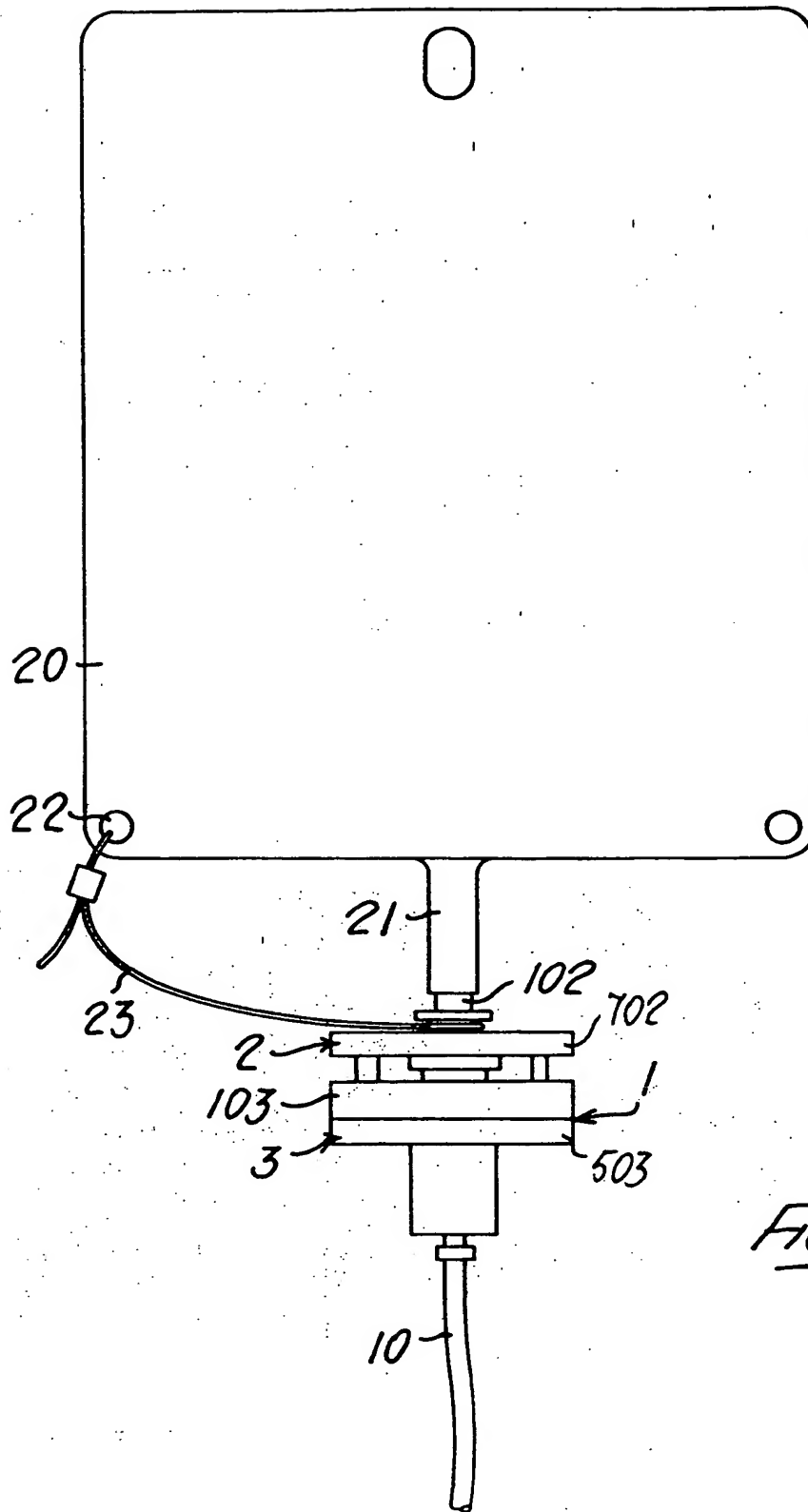
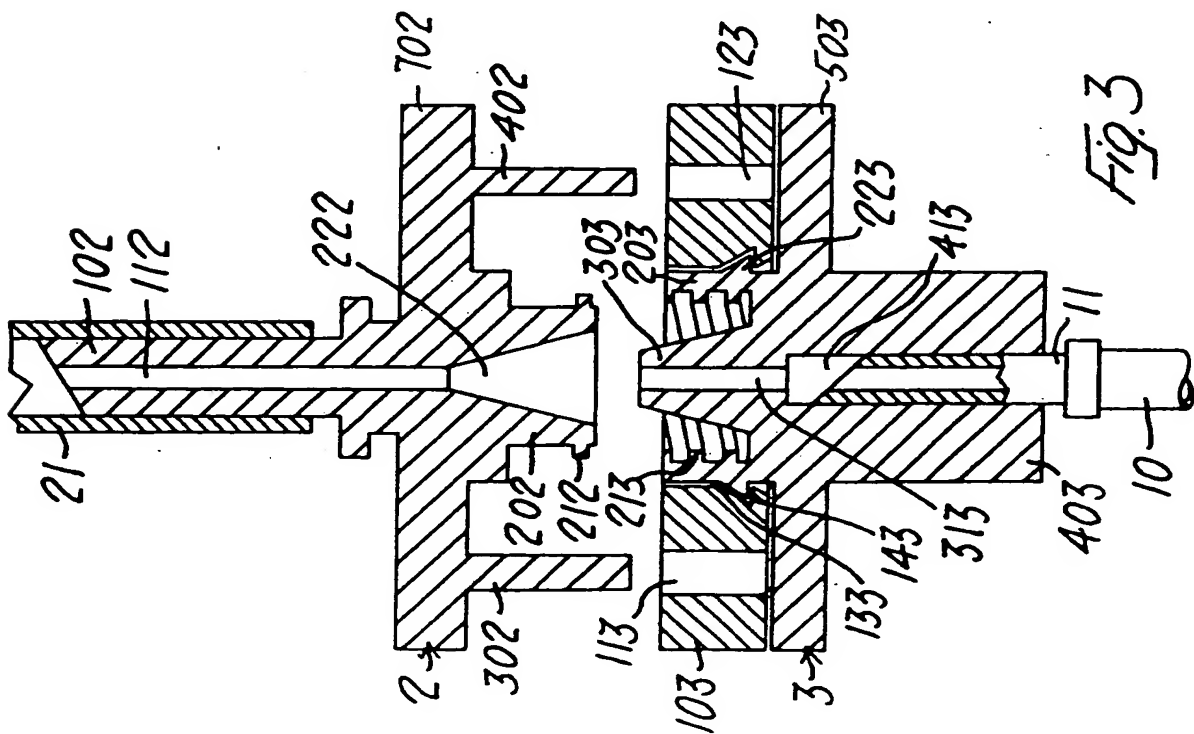
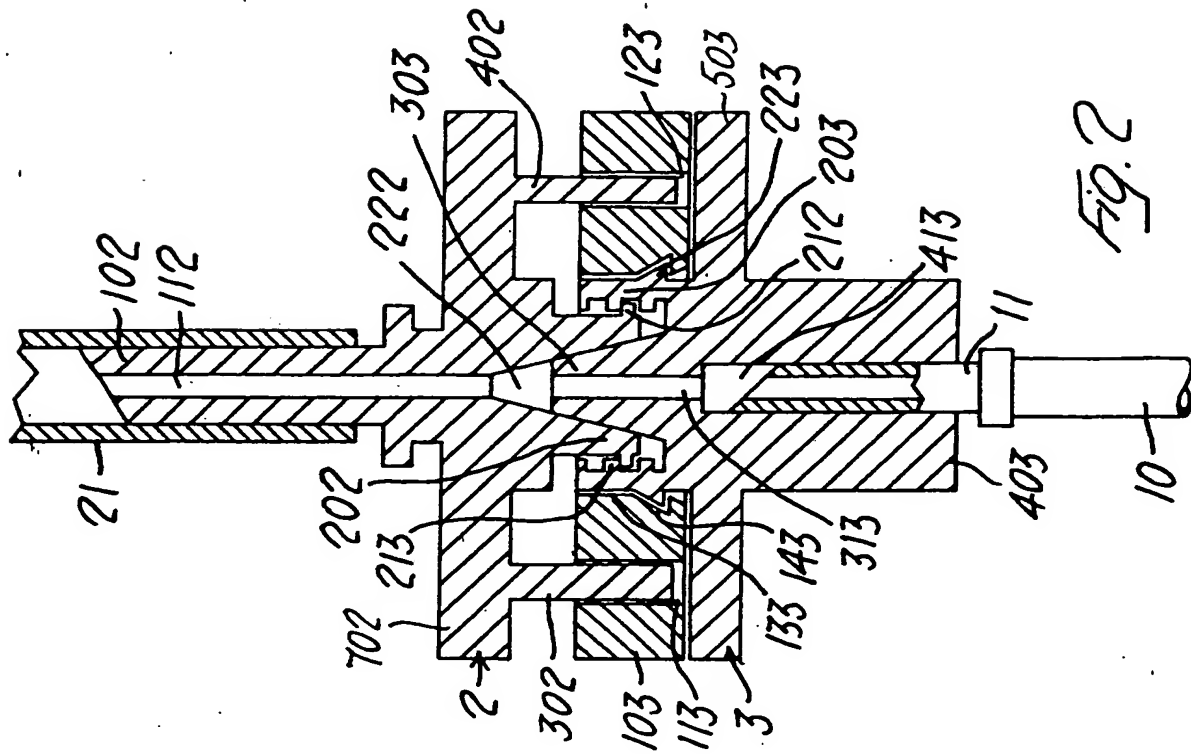
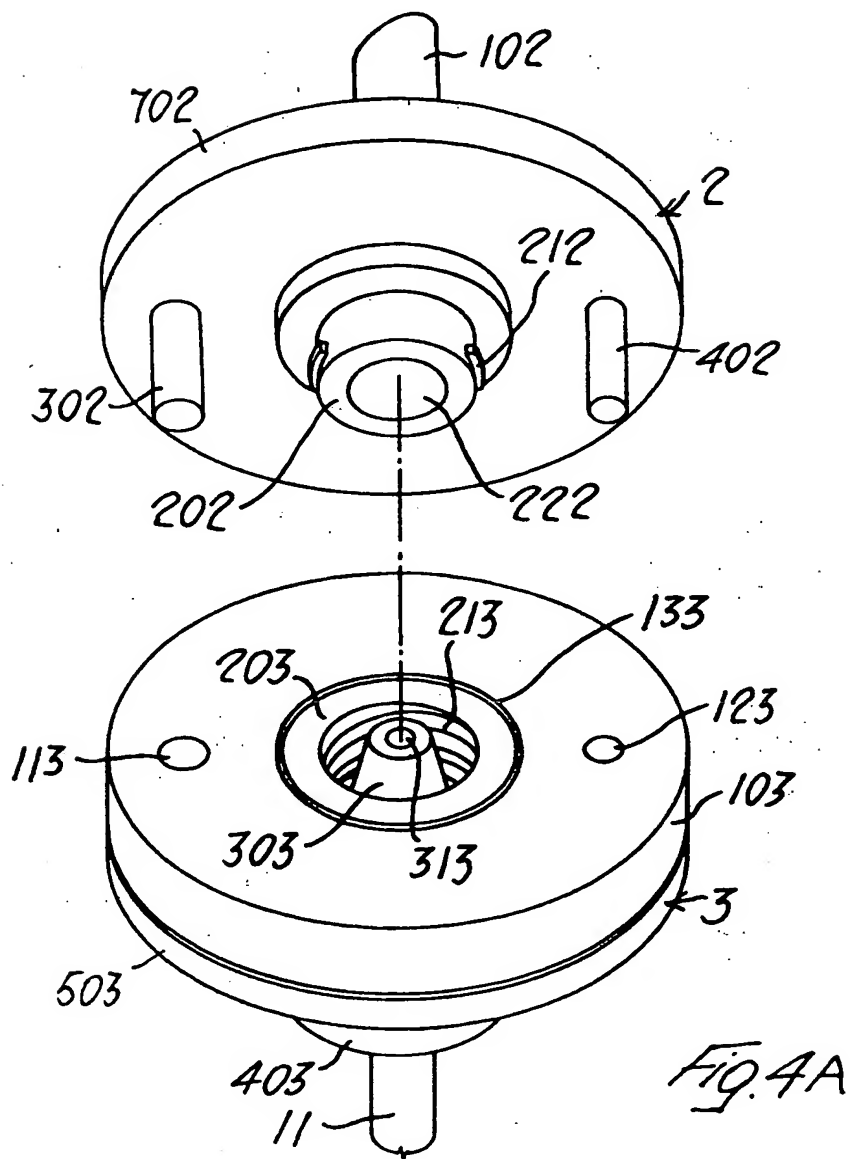
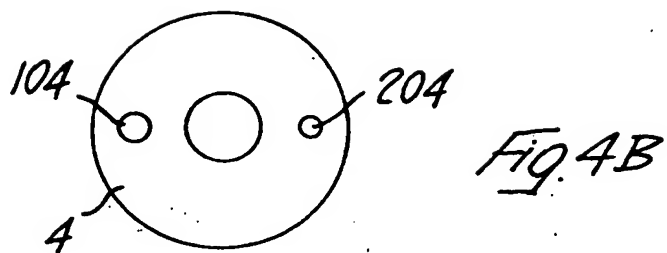
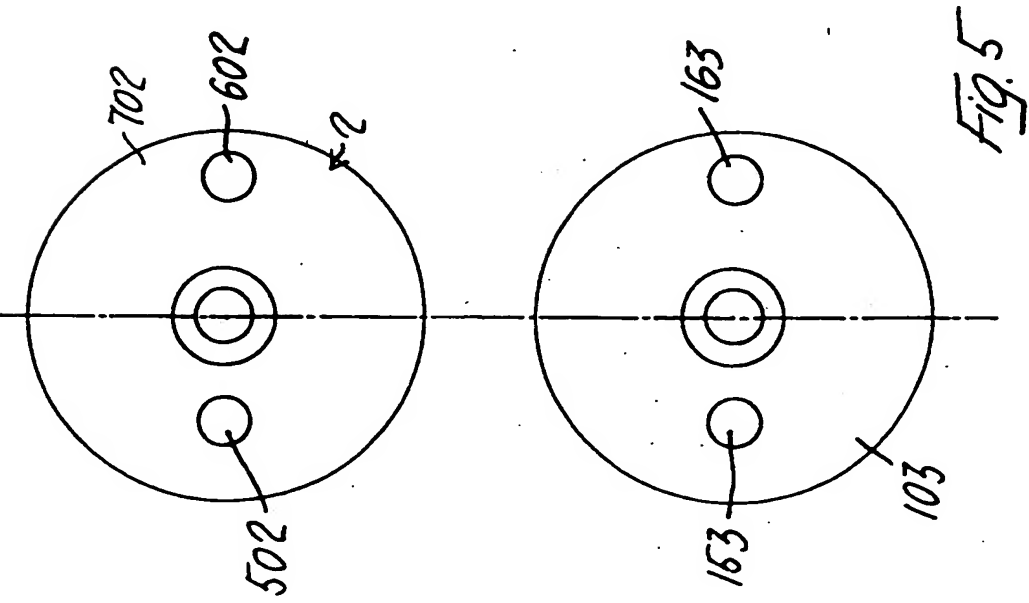
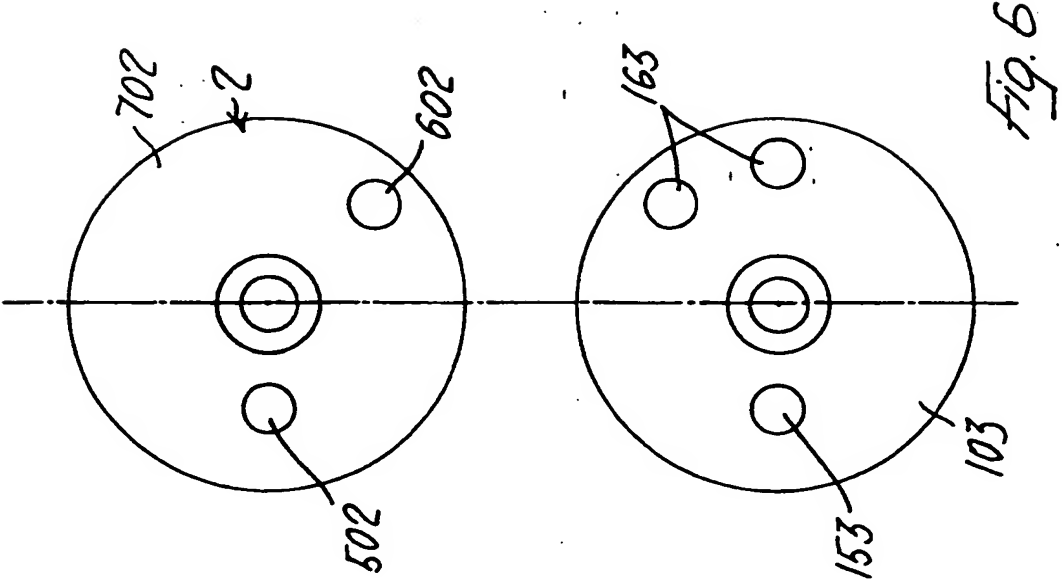
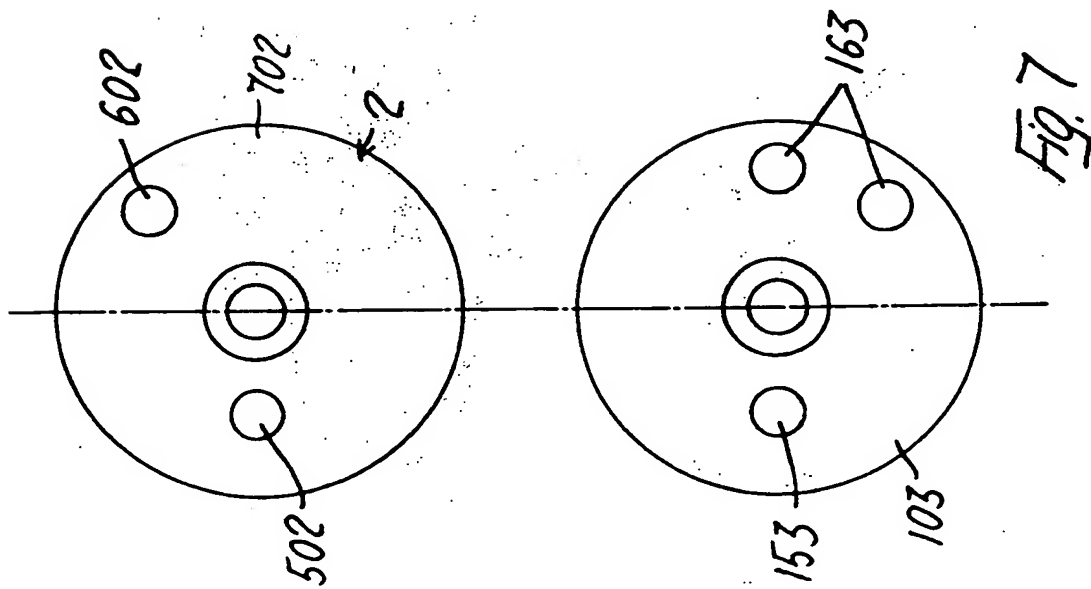
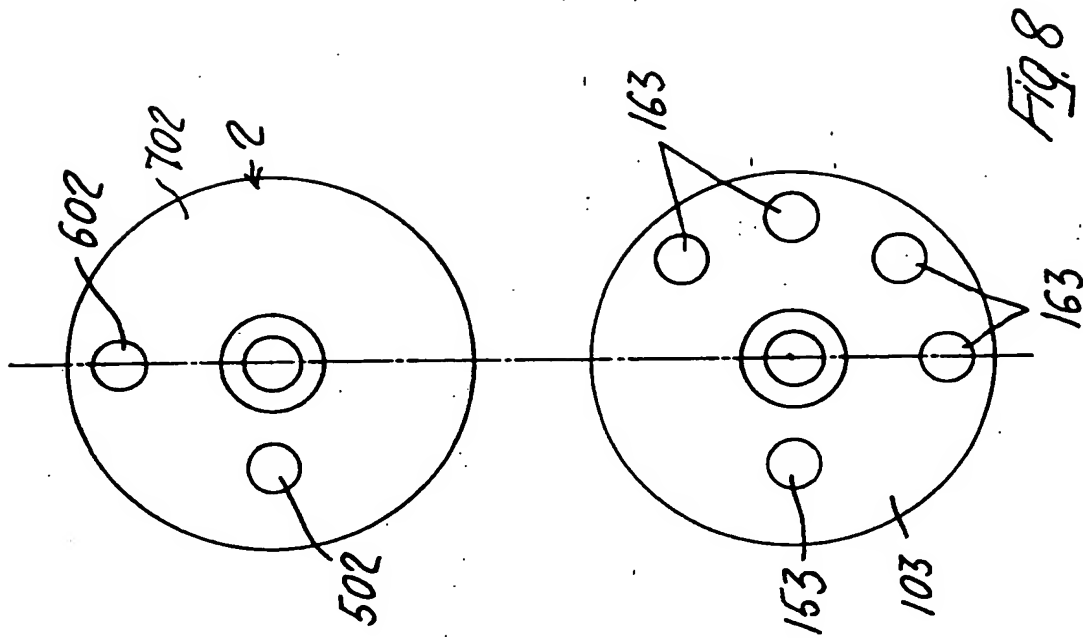


Fig. 1









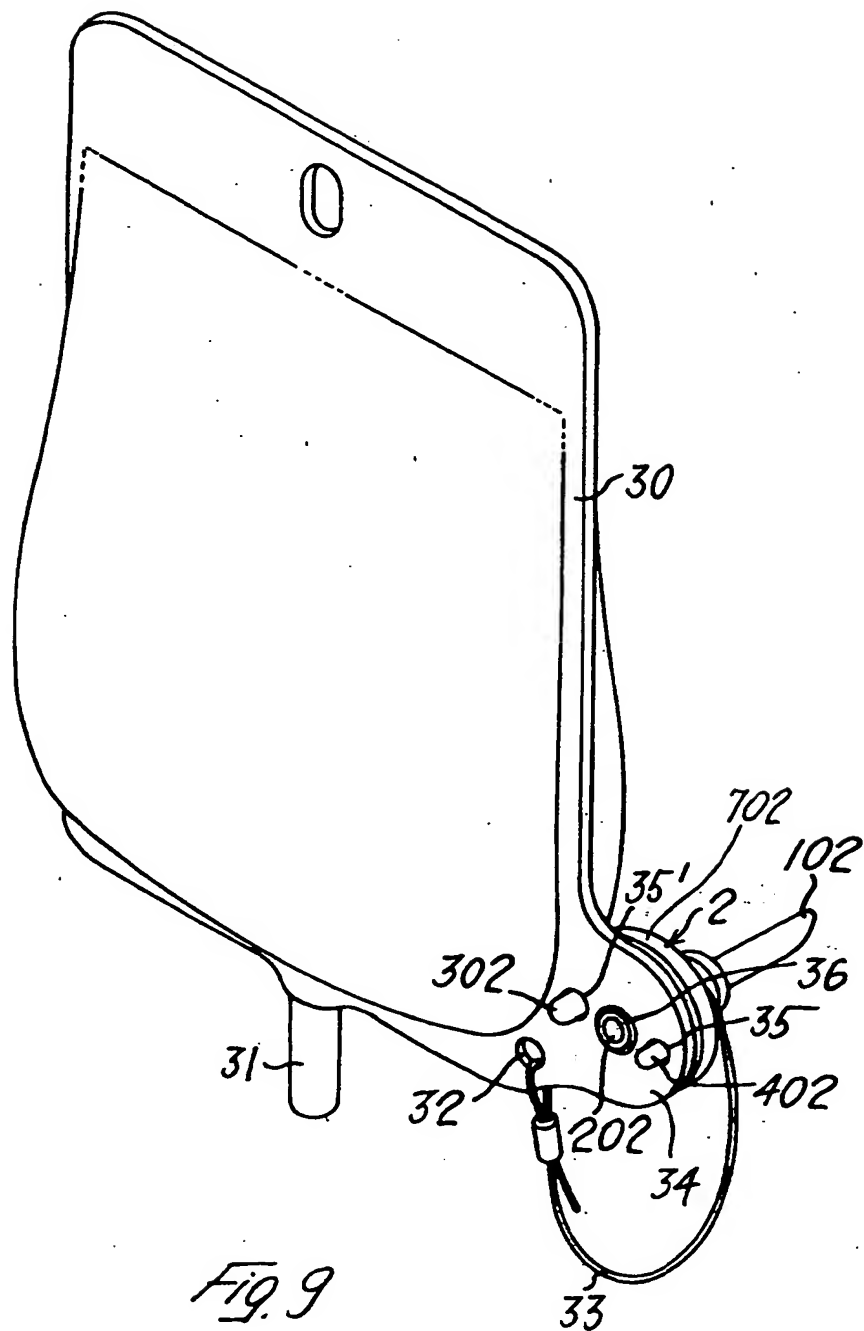


Fig. 9



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EUROPEAN SEARCH REPORT

Application Number
EP 96 11 7750

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|--|--|--|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
| X | US 4 619 640 A (POTOLSKY ET AL.) * column 5, line 1 - line 38 * | 1-5,7 | A61M39/10 A61J1/10 |
| A | * claims 1,2,9; figure 4 * | 6 | |
| A | FR 2 593 706 A (CENTRE NATIONAL DE TRANSFUSION SANGUINE) * page 6, line 37 - page 7, line 23 * * figures * | 1,2,11 | |
| A | GB 2 063 684 A (BAXTER TRAVENOL LABORATORIES INC.) * page 2, line 39 - line 46 * * figures 3,6,11 * | 8 | |
| A | US 4 280 723 A (MOLDESTAD) * column 2, line 67 - column 3, line 22 * * claim 1; figures 1-4 * | 1,8 | |
| | | | TECHNICAL FIELDS SEARCHED (Int.Cl.6) |
| | | | A61M A61J |
| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 25 February 1997 | Examiner Sedy, R |
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